



Institute for Materials Science

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IMS Sponsored Lecture Series



Dr. Gergely Zimanyi
University of California -Davis

Nanoparticle Solar Cells: Upconversion, Downconversion, Transport

Tuesday, December 13, 2016

10:00 - 11:00 am

MSL Auditorium (TA-03 - Bldg 1698 - Room A103)

Abstract: Recent research on nanoparticle solar cells will be reviewed. First, various implementations of the exciting downconversion mechanism of carrier multiplication will be reviewed. Second, a new paradigm will be proposed to further boost the energy conversion efficiency, the implementation of the leading upconversion mechanism called intermediate band mechanism. It will be argued that recent experiments by the Los Alamos group have brought this implementation tantalizingly close. Finally, the charge transport in nanoparticle systems will be analyzed. An atoms-to-devices hierarchical model has been developed to simulate transport. A quantitative agreement with FET transport experiments will be demonstrated. Then the metal-insulator transition will be analyzed. Time permitting, percolation and commensuration effects will be discussed as well.

Bio: Gergely Zimanyi got his Ph.D. in Hungary, studying Anderson localization and the Kondo effect. In the US, he was an IBM postdoc where he developed an early model for high T_c superconductivity, and studied dissipative Josephson junction arrays. After joining the UC Davis faculty, he studied cold atom problems, and vortex physics in high T_c materials. In the last ten years he focused on Energy Science. He works with Toyota to develop better permanent magnets. His primary research project focuses on nanoparticle solar cells. Finally, very recently he invented photovoltaic desalination.

To be on Dr. Gergely Zimanyi 's Agenda or for general information contact
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